load protection systems . . . that permit a digger derrick rotation motor or other rotatable equipment to freely rotate toward a side load." (Page 3, lines 10-13 of the specification). In particular, the present invention seeks to remedy problems associated with side load systems that allow a boom to rotate upon application of a pre-determined maximum or critical side load. As described in the *Description of the Prior Art* of the pending application, a common problem is that an operator routinely relies on the side load protection system, which causes wear and tear on the boom. As stated on page 2, lines 25-29, "operators who are aware of side load protection systems may intentionally neglect to rotate a digger derrick's boom to follow an anchor into the ground, knowing that the side load protection system will permit the turntable and boom to slip or rotate toward the side load once an excessive amount of side load has been exerted on the boom." (See also page 9, lines 22-25 of the specification). Unfortunately, "by the time the side load protection system is enabled, the side load may have already caused damage to the digger derrick and/or reduced the pullout strength of an installed anchor." (Page 9, lines 26-30 of the specification).

Therefore, the present invention is **not** a side load protection system that merely allows the boom to rotate upon application of a maximum side load. Instead, the present invention is a rotational float system that allows the operator to relieve the side load caused by normal operation *before* the side load protection system is activated, i.e. before the maximum or critical side load is reached. (Page 9, lines 31-33 of the specification).

To accomplish the rotational float feature, the present invention uses a valve structure 46 interposed between two hydraulic lines 36,38 connected to first and second ports 32,34 of a rotation motor 20. When the valve structure is switched to an open position, hydraulic fluid may flow freely between the two hydraulic lines, thus equalizing the pressure between the first and second ports 32,34

of the rotation motor 20. The rotation motor is then in a "float" condition. In operation, as the operator of a boom attempts to insert an anchor into the ground, an increasingly larger side load is exerted on the boom, which creates an increasingly larger pressure differential between the first and second ports 32,24. Using just a side load protection system, the side load would cause pressure build-up, i.e. the pressure differential, until a pre-determined critical pressure level is reached. Upon reaching the maximum or critical pressure level, the side load protection system would allow the pressure to be released, which would allow the boom to rotate. In contrast, the rotational float system of the present invention equalizes this pressure differential **before** reaching the maximum pressure level, which causes the boom to rotate toward the anchor gradually upon application of increasingly larger side load. (See page 10, lines 2-11). Equalizing the pressure before the pressure differential builds to a maximum level decreases the wear and tear on the boom and prevents reduced pullout strength of the installed anchor, as noted above.

Dixon discloses a side load protection system that is designed to allow the boom to rotate upon a pre-determined application of a maximum or critical side load, as stated on column 2, lines 45-49. In rejecting independent claims 1 and 12 of the present invention, the Examiner states that Dixon discloses a "control mechanism (64) that switches the valve (63) between open and closed positions thereby allowing pressure equalization between motor ports (66) (see column 8, lines 15-27)." Applicant respectfully disagrees. Numeral 63 of Dixon identifies a rotation control valve, and numeral 64 identifies a valve shuttle. Connected to the rotation control valve (63) are two motor connection lines (66). Liquid flow from a rotation motor (21) (which operates a boom) is via one of the lines (66) and liquid flow to the rotation motor (21) is via the second of the lines (66). "Shifting of the shuttle (64) from one extreme to the other reverses the hydraulic input to the motor to reverse

its direction of operation." (Column 6, lines 39-42). Therefore, hydraulic fluid flows from the motor and to the valve to obtain operation of the boom in one direction, and hydraulic fluid flows to the motor and from the valve to obtain operation of the boom in a second and opposite direction. Nowhere does Dixon state or even imply that the rotation control valve (63) equalizes pressure between the lines (66). Instead, the rotation control valve (63) is merely a proportional control valve that determines the direction and speed of the rotational system by steering hydraulic fluid, and thus, hydraulic power, to the appropriate lines (66) by shifting the shuttle (64) between extreme positions. This proportional control valve actually creates a *pressure differential* between lines (66) and does not act to equalize the pressure.

In some instances, the rotation "motor (21) may serve as a brake to prevent boom rotation even when the brake mechanism is released." (Column 7, lines 60-62). In these instances, pressure will build up in either one of the connection lines (66). (Column 8, lines 3-4). To allow the boom to rotate, Dixon discloses a double acting relief valve (22) that has a pair of ball and spring check valves (83), which the Examiner refers to as blocking valves. Upon application of sufficient pressure to overcome the bias of the check valve spring, the hydraulic pressure is transmitted through the check valve (83), allowing circulation of pressurized fluid. (Column 8, lines 11-17). The circulation is "allowed from one motor connection line (66) to the other whenever the pressure is sufficient to overcome the spring bias in the valve." (Column 8, lines 17-20). The side load thus acts on the boom to "create sufficient hydraulic back pressure in the rotation motor to overcome the resistance of the relief valve (22) . . . and permit the boom to be rotated by the side load." (Column 8, lines 20-26).

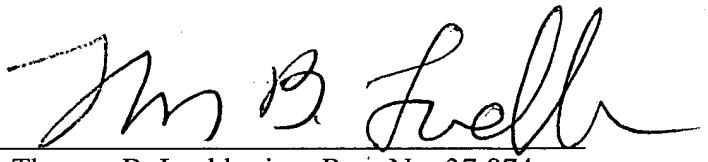
Therefore, Dixon clearly does not disclose a valve structure that equalizes the pressure so that a boom may be rotated as the side load increases, and in particular, Dixon does not disclose a control mechanism for equalizing pressure between first and second ports of a rotation motor, as claimed in pending independent claims 1 and 12. Instead, Dixon discloses a valve structure that creates a pressure differential, which only allows the boom to be rotated upon a pre-determined maximum application of pressure, i.e. side load, and therefore, is exemplary of the problem the present invention remedies.

The remaining claims all depend directly or indirectly from independent claims 1 and 12 and thus, should be in a condition for allowance.

In view of this amendment and the remarks herein, applicant respectfully submits that claims 1-21 are now in allowable condition and requests a Notice of Allowance. In the event of further questions, the Examiner is urged to call the undersigned. Any additional fee which might be due in connection with this application should be applied against our Deposit Account No. 19-0522.

Respectfully submitted,

HOVEY WILLIAMS LLP

BY: 

Thomas B. Luebbering, Reg. No. 37,874
2405 Grand Blvd., Suite 400
Kansas City, Missouri 64108
(816) 474-9050

ATTORNEYS FOR APPLICANTS